

Appln No. 10/036,235
Amdt date May 11, 2004
Reply to Office action of January 21, 2004

Amendments to the Specification:

Please amend the paragraph beginning on page 4, line 34 as follows:

FIG. 10 is a schematic view ~~comparing of~~ of the deformity caused by Kyphosis ~~with the desired lordosis of a lumbar spine.~~

Please amend the paragraph beginning on page 5, line 4 as follows:

~~FIG. 12 is a~~ FIGs. 12a and 12b are cross-sectional ~~view~~ views of the placement of an embodiment of alignment rods into an embodiment of pedicle screws according to the invention.

Please amend the paragraph beginning on page 5, line 6 as follows:

~~FIG. 13 is a~~ FIGs. 13a and 13b are schematic ~~view~~ views of the manipulation and alignment of the spine utilizing an embodiment of the vertebral alignment system according to the invention.

Please amend the paragraph beginning on page 5, line 9 as follows:

~~FIG. 14 is a~~ FIGs. 14a and 14b are schematic ~~view~~ views of the point of rotation of the vertebral alignment system according to the invention.

Please amend the paragraph beginning on page 8, line 30 as follows:

~~FIGs. 12 and 13~~ 12a to 13b show a spinal alignment and fixation procedure utilizing the vertebral alignment apparatus and system described above. First a cannulated pedicle screw **12** according to the invention would be placed into the left and right pedicle **56** of the individual vertebra **52**. An alignment rod **10**, as described above, would then be inserted into the cannulated pedicle screw **12** and secured into the barrel of the cannulated pedicle screw. After this procedure, the alignment rod **10** extends above the screw **12** for a distance preferably between 4 to 12 inches, however any extension distance may be used depending upon the lever force the surgeon desires. Different size rods allow the surgeon to apply appropriate forces and lever to the spinal vertebral body. In one embodiment, the alignment

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rods **10** also have threaded ends **38** at the tops of the alignment rods permitting the surgeon to screw T-handles **40** (See FIGs. 12a and 13b), or other appropriate manipulation devices, such as for example, alignment cages to the ends of the alignment rods. The alignment rods **10** are then used to manipulate and align the vertebral body **52** to the desired angle and position according to known techniques, after which the position is verified by visualization and by X-ray. The surgeon has the capacity to use the alignment rods **10** that are inserted into the hollow pedicle screw **12** because there is ligamentous laxity to each individual vertebral segment **52**. This ligamentous laxity allows the surgeon to manipulate the vertebral body. For example, the surgeon would rotate or tilt the vertebral body to correct scoliosis, pull or push the vertebral body to correct spondylolisthesis or retrolisthesis, tilt the vertebral body to improve sagittal alignment to promote lumbar lordosis and reduce flat back syndrome. Compression and distraction can also be applied to these points as well to promote correction of deformity.

Please amend the paragraph beginning on page 9, line 20 as follows:

Alternatively, after the vertebral body **52** has been tapped and prepared for the implantation of the pedicle screw **12**, the vertebral alignment system according to the present invention enables the surgeon to install the pedicle screw **12** by connecting the screwdriver handle **54** to the distal end of the alignment rod **10**, placing the pedicle screw **12** on the proximal end of the alignment rod **10** and implanting the pedicle screw (See FIGs. 12b and 13a). Once the pedicle screw **12** is secured into the vertebral body **52**, the surgeon may utilize the pedicle screw to navigate the spinal segment and correct the spinal deformity and not just as a point of attachment for the fixation hardware.

Please amend the paragraph beginning on page 10, line 30 as follows:

It is important to note that the instantaneous center of rotation of a spinal segment is in the posterior lateral corner of the vertebral body. The alignment

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rod 10 of the present invention is designed to fit into the pedicle screw at closely the approximate point 56 at which the center of rotation occurs in the vertebral segment 52, as shown in ~~FIG. 14~~ FIGs. 14a and 14b. This allows the surgeon to apply force as a lever to the pedicle screw and use the lever of the pedicle screw to alter the vertebral body's position at its instantaneous center of rotation. Predictably, this ability to mate the lever to the screw inside the pedicle allows the surgeon maximum ability to correct deformities.